

Trend Study 16A-15-02

Study site name: Old Pinery.

Vegetation type: Chained, Seeded P-J.

Compass bearing: frequency baseline 175 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

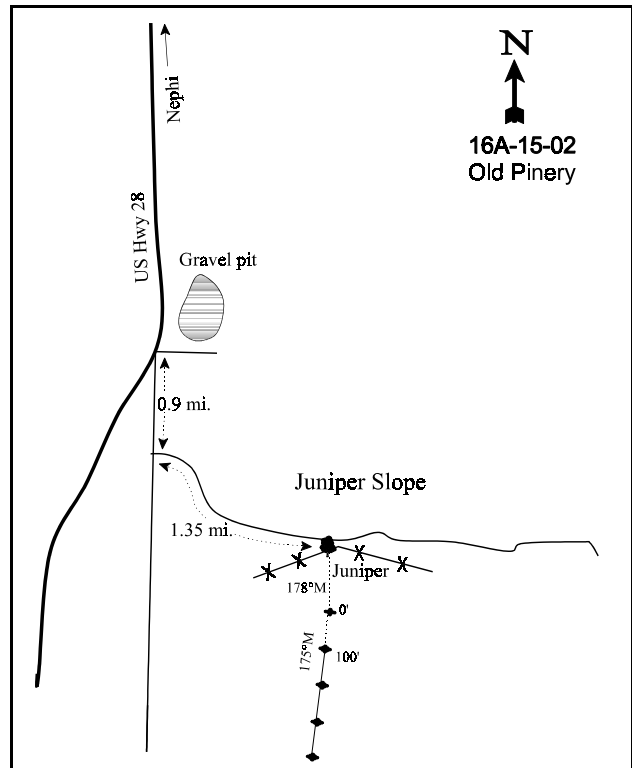
LOCATION DESCRIPTION

From Nephi, proceed south on U.S. 28 to a dirt road just past a gravel pit. Turn left on the dirt road, and proceed south 0.9 miles to another intersection. Turn left at the intersection and proceed southeast for 1.35 miles toward Old Pinery Canyon. Stop at the corner of the fenceline. From the easternmost of the two middle fenceposts, the 0-foot marker of the baseline is located 130 paces away at an azimuth of 178 degrees magnetic. The study is marked by green steel "T" fenceposts approximately 12 to 18 inches in height. A red browse tag, number 3960, is attached to the 0-foot baseline stake.



Map Name: Nephi

Township 13S, Range 1E, Section 33



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4388462 N 428889 E

DISCUSSION

Old Pinery - Trend Study No. 16A-15

The Old Pinery trend study is located on privately owned rangeland located south of Old Pinery Creek. Previously the area was dominated by juniper and pinyon, but has since been chained and seeded. Elevation is 5,700 feet with a gentle west facing slope of 3%. Tree removal was relatively successful with only 21 juniper trees/acre in the 8-10 foot class estimated on the site in 2002. A few of the trees sampled were tipped-over mature trees that were still growing. Animal use was very low in 1983 due to lack of cover and forage. However, deer pellet groups were common with a quadrat frequency of 41% in 1997. Old cattle sign was also noted that year with a quadrat frequency of 18%. There was no sign of elk use. A pellet group transect read along the study site baseline in 2002 estimated 94 deer days use/acre (233 ddu/ha) and 22 cow days use/acre (54 cdu/ha). All of the cattle use appears to be from the previous year (2001) but most deer pellet groups appear to be from winter use.

Soil at the site is a deep, alluvially deposited loam with an effective rooting depth estimated at 19 inches. Few rocks are found on the surface and in the profile. Soil reaction is slightly acidic (pH of 6.2). Erosion is not currently a problem due to the abundant vegetation and litter cover combined with the gentle terrain. The soil erosion condition classification was determined as stable in 2002.

The browse composition consists primarily of mountain big sagebrush which accounted for 86% of the browse cover in 2002. Total browse cover is low however, averaging only about 7% in 1997 and 12% in 2002. Data from 1983 estimated a population density of 1,332 sagebrush plants/acre. During this reading, there were no young plants or seedlings encountered and use was light. Density increased 71% to 4,532 plants/acre by 1989 due to a dramatic increase in the number of young plants (0 to 3,433 plants/acre). Seedlings were also abundant (8,166 plants/acre) which would indicate an expanding population. Use was mostly light and vigor good. With the larger sample used in 1997, density was estimated at 2,040 plants/acre. The lack of any dead plants would suggest that this significantly larger sample is a more accurate estimate of sagebrush density over the entire area, especially when the population is clumped or has a discontinuous distribution. The 1997 population was mostly young (69%), and seedlings were also abundant. Utilization was light to moderate on most plants with only a few individuals receiving heavy use. Seed heads from the 1996 growing season indicated excellent seed production. Density of sagebrush increased to 3,340 plants/acre by 2002. Use continues to be light to moderate with a few individuals displaying heavy use. Vigor remains good and decadence low. Annual leader growth of mature plants averaged nearly 3 inches in 2002 and seed heads were abundant. Young plants were still abundant and the population appears to be expanding.

The only other preferred browse found on the site consists of a few scattered, heavily hedged bitterbrush plants. Only 80 plants/acre were estimated in 2002. All plants sampled displayed a clubbed appearance. Broom snakeweed, an invader, has had a dynamic fluctuating population ranging from 633 plants/acre in 1983 to 8,565 in 1989, and 900 plants/acre in 2002.

The herbaceous understory was dominated by cheatgrass in 1983 and it appeared that the seeding was not successful. Seeded and native perennial grasses were rare and no perennial forbs were encountered that year. By 1989, sum of nested frequency for perennial grasses nearly tripled. A few perennial forbs were also encountered. During the 1997 reading, seeded and native grasses continued to increase. Cheatgrass was still present, but only accounted for 10% of the grass cover. Rattail fescue was also abundant in 1997 providing 24% of the total grass cover. Western wheatgrass and Sandberg bluegrass were also abundant. More perennial forbs were found in 1997. However, annual species were still dominant providing 86% of the forb cover. In 2002, nested frequency of perennial grasses continued to increase and cover doubled. Perennial forbs were still limited.

1983 APPARENT TREND ASSESSMENT

This study is an interesting management situation because it is illustrative of a poorly planned and executed seeding project. Poor value juniper-pinyon range has been converted to even less productive range. Current forage production from all classes of vegetation is probably less than 30 lbs/acre. If no further seeding is done, there will be a slow increase in sagebrush and perhaps a more rapid invasion of snakeweed. Perennial grasses will also improve but very slowly. The greatest threat to the area is from fire. A second attempt at seeding a mixture of desirable shrubs, forbs, and grasses could possibly improve conditions.

1989 TREND ASSESSMENT

The variability of seeding success after the juniper chaining remains obvious. Those areas not occupied by a dense stand of crested wheatgrass have an abundance of cheatgrass, annual forbs, and broom snakeweed. The site shows definite improvement over 1983, when the whole area appeared to be in an impoverished condition. In addition, the study is located in one of the poorer locations of the whole treatment. Ground cover characteristics have changed since 1983. Litter cover has declined from 75% to 63%, while bare ground increased from 18% to 27%. However, it appears from photos that this change is primarily the result in a change from mostly cheatgrass to a stand of perennial grasses. Trend is considered stable at this time. Trend for mountain big sagebrush is up. Density has increased from 1,332 plants/acre to 4,532. The sagebrush is vigorous and lightly hedged. There has been a definite increase in recruitment which would indicate an expanding population. Density of broom snakeweed has also increased dramatically. It appears to be expanding on areas without good perennial grass competition. Trend for the herbaceous understory is up. Quadrat frequency of crested wheatgrass increased from 14% to 48%. The natives, Sandberg bluegrass and western wheatgrass have increased significantly and are now common along the baseline. No perennial forbs were identified in 1983, but several species were identified in 1989. However, none are valuable as forage.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - up (5)

1997 TREND ASSESSMENT

Soil trend continues to be stable. Percent bare ground declined from 27% to 14% with litter cover also declining significantly from 63% to 36%. Erosion is currently not a problem due to the gentle terrain combined with excellent cover from herbaceous species. The browse trend appears to be improving despite the supposed decline in sagebrush density. It should be noted that no dead sagebrush were found on the site suggesting that the larger sample used this year is responsible for the change in sagebrush density. The larger sample and improved design gives significantly better population estimates for species with clumped or discontinuous distributions. Currently, the population is mostly young (69%) with a very high biotic potential (proportion of seedlings to the population) of 45%. This would indicate an expanding population. Another positive sign is the decline in broom snakeweed density. The herbaceous trend is also up with an increase in sum of nested frequency for perennial grasses and forbs. However, the forb composition is dominated by annuals which account for 86% of the forb cover.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - up (5)

2002 TREND ASSESSMENT

Trend for soil continues to be stable. There is abundant protective ground cover and erosion is minimal. Trend for sagebrush is also up. Density has increased by 39%, use is light to moderate, vigor good, and decadence low. Cover of sagebrush has increased from 6% to 10%. Recruitment continues to be excellent indicating a continued expanding population. Another positive change is the continued decline in density of broom snakeweed. Trend for the herbaceous understory is up slightly due to an increase in the sum of nested frequency of perennial grasses. Frequency of cheatgrass remained stable. Composition has changed somewhat due to a dramatic increase in the nested frequency of the low value bulbous bluegrass which now makes up 43% of the total grass cover. Continued spring livestock grazing will further drive this area to be dominated by bulbous bluegrass. Perennial forbs are still rare.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - up slightly (4)

HERBACEOUS TRENDS --

Herd unit 16A, Study no: 15

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
G	Agropyron cristatum	a ³⁵	b ¹²¹	b ¹¹⁰	b ¹⁰⁷	14	48	48	43	5.19	6.10
G	Agropyron smithii	a ²³	b ¹⁴⁸	c ¹⁶³	bc ¹⁴⁴	10	52	54	50	3.49	3.78
G	Agropyron spicatum	ab ²³	a ⁷	bc ³⁶	c ⁶⁰	12	3	18	25	1.39	3.37
G	Bromus japonicus (a)	-	-	-	18	-	-	-	9	-	.04
G	Bromus tectorum (a)	-	-	259	259	-	-	90	84	2.30	3.27
G	Festuca myuros (a)	-	-	b ²⁷⁷	a ⁸¹	-	-	80	36	5.50	.20
G	Poa bulbosa	a ⁻	a ⁻	b ⁶⁴	c ²⁴⁶	-	-	25	75	.89	14.90
G	Poa pratensis	b ⁵⁵	a ⁻	b ⁻	c ⁴	29	-	-	1	-	.15
G	Poa secunda	a ⁴	b ¹⁰⁴	d ¹⁹⁰	c ¹³⁸	2	45	74	54	3.79	2.79
G	Sitanion hystrix	-	8	-	3	-	3	-	1	-	.03
Total for Annual Grasses		0	0	536	358	0	0	170	129	7.80	3.52
Total for Perennial Grasses		140	388	563	702	67	151	219	249	14.77	31.14
Total for Grasses		140	388	1099	1060	67	151	389	378	22.58	34.68
F	Agoseris glauca	-	-	7	4	-	-	2	2	.01	.01
F	Alyssum alyssoides (a)	-	-	b ²⁸¹	a ¹²⁷	-	-	88	43	.91	.31
F	Allium spp.	a ⁻	b ⁵⁷	b ⁴⁷	a ⁴	-	27	21	2	.13	.01
F	Astragalus spp.	a ⁻	a ⁻	b ⁹	a ⁴	-	-	5	2	.10	.03
F	Astragalus utahensis	-	-	2	3	-	-	1	1	.15	.00
F	Calochortus nuttallii	-	-	11	3	-	-	4	1	.02	.00
F	Cerastium spp.	a ⁻	b ¹⁶	a ⁻	a ⁻	-	6	-	-	-	-
F	Cirsium spp.	a ⁻	a ⁻	b ⁹	a ³	-	-	4	1	.05	.06
F	Convolvulus arvensis	-	-	2	-	-	-	1	-	.00	-
F	Collinsia parviflora (a)	-	-	b ¹⁹⁶	a ¹⁰³	-	-	68	40	.78	.57

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
F	Cymopterus longipes	a-	a3	b17	a7	-	3	8	3	.21	.06
F	Descurainia pinnata (a)	-	3	-	-	-	2	-	-	-	-
F	Draba spp. (a)	-	-	-	5	-	-	-	2	-	.01
F	Epilobium brachycarpum (a)	-	-	b75	a7	-	-	29	3	.14	.01
F	Erodium cicutarium (a)	-	-	b158	a31	-	-	55	11	1.72	.57
F	Erigeron spp.	-	-	2	-	-	-	1	-	.00	-
F	Eriogonum racemosum	-	-	6	5	-	-	3	2	.04	.01
F	Grindelia squarrosa	-	-	3	-	-	-	1	-	.00	-
F	Holosteum umbellatum (a)	-	-	-	6	-	-	-	2	-	.01
F	Lactuca serriola	a-	c26	b11	a-	-	12	5	-	.02	-
F	Microsteris gracilis (a)	-	-	b58	a5	-	-	22	3	.16	.01
F	Phlox longifolia	a-	b9	c32	bc24	-	5	13	11	.09	.08
F	Polygonum douglasii (a)	-	-	b23	a1	-	-	10	1	.05	.00
F	Ranunculus testiculatus (a)	-	-	b287	a163	-	-	85	56	2.15	1.01
F	Sphaeralcea coccinea	-	3	-	-	-	1	-	-	-	-
F	Tragopogon dubius	a-	a3	b9	a-	-	1	6	-	.05	-
F	Vicia americana	-	-	9	9	-	-	3	4	.06	.12
Total for Annual Forbs		0	3	1078	448	0	2	357	161	5.93	2.52
Total for Perennial Forbs		0	117	176	66	0	55	78	29	0.96	0.39
Total for Forbs		0	120	1254	514	0	57	435	190	6.89	2.92

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Herd unit 16A, Study no: 15

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Artemisia tridentata vaseyana	46	66	5.53	10.01
B	Gutierrezia sarothrae	19	17	.53	.83
B	Juniperus osteosperma	1	1	.15	.76
B	Purshia tridentata	3	4	.42	.07
Total for Browse		69	88	6.63	11.67

CANOPY COVER --

Herd unit 16A, Study no: 15

Species	Percent Cover		Trees per Acre		Average diameter (in)	
	'97	'02	'97	'02	'97	'02
Juniperus osteosperma	-	.6	12	21	3.2	6.8

Key Browse Annual Leader Growth
Herd unit 16A , Study no: 15

Species	Average leader growth (in) '02
Artemisia tridentata vaseyana	2.8

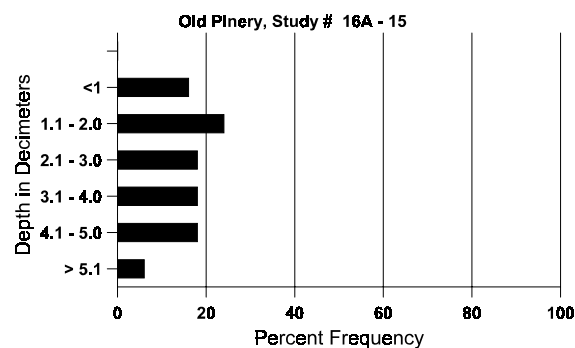
BASIC COVER --
Herd unit 16A, Study no: 15

Cover Type	Nested Frequency		Average Cover %			
	'97	'02	'83	'89	'97	'02
Vegetation	387	382	3.00	9.50	43.06	53.96
Rock	103	58	2.25	.25	4.32	1.16
Pavement	175	180	0	.50	.67	1.03
Litter	395	387	75.00	63.00	36.01	38.60
Cryptogams	262	64	1.50	0	5.95	1.58
Bare Ground	266	229	18.25	26.75	14.39	16.45

SOIL ANALYSIS DATA --
Herd Unit 16A, Study no: 15, Old Pinery

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
19.1	44.8 (16.9)	6.2	37.4	39.7	22.8	1.8	19.2	208.0	.4

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 16A, Study no: 15

Type	Quadrat Frequency		Pellet Transect	
	'97	'02	Pellet Groups per Acre '02	Days Use per Acre (ha) '02
Rabbit	12	12	-	-
Elk	-	1	-	-
Deer	41	58	1228	94 (233)
Cattle	18	9	22	22 (54)
Horse	-	-	9	N/A

BROWSE CHARACTERISTICS --

Herd unit 16A, Study no: 15

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia tridentata vaseyana																	
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	89	162	-	-	16	-	-	67	-	-	245	-	-	-	8166		245
	97	36	10	-	-	-	-	-	-	-	46	-	-	-	920		46
	02	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	89	86	-	-	5	-	-	12	-	-	103	-	-	-	3433		103
	97	62	-	8	-	-	-	-	-	-	70	-	-	-	1400		70
	02	56	1	1	-	-	-	-	-	-	58	-	-	-	1160		58
M	83	38	-	-	-	-	-	-	-	-	38	-	-	-	1266	13 13	38
	89	27	1	-	-	-	-	-	-	-	28	-	-	-	933	15 16	28
	97	18	11	2	-	-	-	-	-	-	31	-	-	-	620	22 41	31
	02	58	34	8	-	-	-	-	-	-	100	-	-	-	2000	18 27	100
D	83	2	-	-	-	-	-	-	-	-	1	-	1	-	66		2
	89	4	1	-	-	-	-	-	-	-	4	-	-	1	166		5
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	02	1	3	4	-	1	-	-	-	-	7	-	-	2	180		9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
		'83 00%			00%			03%			+71%						
		'89 01%			00%			.73%			-55%						
		'97 11%			10%			00%			+39%						
		'02 23%			08%			01%									
Total Plants/Acre (excluding Dead & Seedlings)												'83	1332	Dec:	5%		
												'89	4532		4%		
												'97	2040		1%		
												'02	3340		5%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	97	7	-	-	-	-	-	-	-	-	7	-	-	140			7	
	02	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	89	119	-	-	-	-	-	-	-	-	119	-	-	3966			119	
	97	14	-	-	-	-	-	-	-	-	14	-	-	280			14	
	02	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	83	19	-	-	-	-	-	-	-	-	19	-	-	633	11	13	19	
	89	123	-	-	1	-	-	-	-	-	124	-	-	4133	11	9	124	
	97	64	-	-	-	-	-	-	-	-	64	-	-	1280	7	8	64	
	02	34	-	-	-	-	-	-	-	-	34	-	-	680	7	8	34	
D	83	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	89	14	-	-	-	-	-	-	-	-	14	-	-	466			14	
	97	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	02	11	-	-	-	-	-	-	-	-	9	-	-	220			11	
X	83	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	02	-	-	-	-	-	-	-	-	-	-	-	-	200			10	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			+93%							
'89		00%			00%			00%			-82%							
'97		00%			00%			00%			-42%							
'02		00%			00%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	633	Dec:	0%			
												'89	8565		5%			
												'97	1560		0%			
												'02	900		24%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	83	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	1	-	1	-	-	-	20	-	-	1
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'83 00%			00%			00%			+ 0%							
		'89 00%			00%			00%			-39%							
		'97 00%			00%			00%			+ 0%							
		'02 00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	33	Dec:	-			
												'89	33		-			
												'97	20		-			
												'02	20		-			
Purshia tridentata																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	2	-	-	1	-	-	-	3	-	-	-	60	11	43	3
	02	-	-	2	-	-	2	-	-	-	4	-	-	-	80	16	49	4
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'83 00%			00%			00%										
		'89 00%			00%			00%										
		'97 00%			100%			00%			+25%							
		'02 00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'89	0		-			
												'97	60		-			
												'02	80		-			